

RESEARCH NOTES

Environmental Concerns in Asia-Pacific Region

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This study primarily identifies major environmental concerns in the Asia-Pacific region. It also addresses regional policy responses and directions. Further, it deals with (a) issues that the international community needs to address, (b) priorities among the plethora of environmental concerns, and (c) policy responses in the Asia-Pacific region.

Keywords: Environmental concerns, Asia-Pacific Region, quality of environment

INTRODUCTION

The Asia-Pacific region extends from Mongolia in the north to New Zealand in the south and from the Cook Islands in the east to the Islamic Republic of Iran in the west. It embraces the world's third largest ocean and a range of other important seas (Economic and Social Council for Asia and the Pacific [ESCAP], 1991 & 1995). The region also encompasses three of the largest and most populous countries in the world (China, India, and Indonesia) and several mountainous and land-locked states (e.g. Bhutan and Nepal).

Although it accounts for only 23% of the world's total land area, about 58% of the world's population live in the Asia-Pacific region (ESCAP, 1995). The economies of this region have experienced high growth rates in the recent past. Despite rapid rate of economic growth, poverty persists. Estimates indicate that of the world's 1.2

billion people who live in absolute poverty (that is with a per capita income of less than US\$ 1 per day) over two-thirds reside in this region. Rapid population growth is exerting pressure on the environment and on the natural resources of the region. Urbanization and industrialization have also led to high pollution loads and social stress. There are several environmental concerns in the region, important among which are: land degradation, deforestation, declining availability of freshwater, deteriorating water quality, and the degradation of marine and coastal resources.

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SALIENT FEATURES OF ASIA-PACIFIC REGION

The term "Asia-Pacific" became popular in the late 1980s as the economies within the heterogeneous region flourished on account of increased regional capital flow, trade, and other forms of economic and political interaction. The inclusion of Oceanian countries such as Australia and New Zealand is largely based upon the economic relationships between those countries and their East Asian trading partners to the north.

In some contexts, the region may extend further to include major Asian countries, as well as those around the Pacific Rim, stretching from Oceania, up to Russia, and down the western coast of the Americas. The Asia-Pacific Economic Cooperation, for example, includes Canada, Chile, Russia, Mexico, Peru, and the United States. The Asia-Pacific region generally includes: Australia, Brunei, Cambodia, People's Republic of China (including Hong Kong and Macau), Republic of China (Taiwan), Fiji, Guam (U.S. territory), Indonesia, Japan, Kiribati, North Korea, South Korea, Laos, Malaysia, New Zealand, Northern Marianas (U.S. territory), Palau, Papua New Guinea, Philippines, Samoa, Singapore, Thailand, Timor-Leste, Tonga, Tuvalu, Vanuatu, and Vietnam

MAJOR ENVIRONMENTAL CONCERNS

Description of the major environmental concerns in the Asia-Pacific region has been presented under following headings:

Land

Compared with other regions, land is scarce and of poor quality. An increasing population has reduced the available land from 0.27 hectares per capita in 1976 to 0.25 hectares per capita in 1986 (ESCAP, 1992). The majority of the developing countries in the region suffer from varying degrees of soil erosion and degradation mainly due to (a) rapid rates of deforestation, (b) poor irrigation and

drainage practices, (c) inadequate soil conservation, (d) steep slopes, and (e) over grazing. 13% of arable land in the region is severely degraded, 41% is moderately degraded and 46% is lightly degraded. Extensive and severe water erosion occurs throughout (a) the Himalayas, (b) South Asia, (c) South-East Asia, (d) large areas of the People's Republic of China, (e) Australia, and (f) the South Pacific.

In India alone, 12.62 million hectares out of a total of 32.77 million hectares of agricultural land is affected by severe water erosion, and in Sri Lanka, 845,000 hectares are affected (United Nations Environment Program, 1994). More than 50% of the world's irrigated land that has been affected by water logging and salinization is located in Asia and the Pacific.

Further, the Asia-Pacific region has the largest population in the world affected by desertification. Altogether, 35% of the productive land in Asia has been affected as of 1996, particularly in: (a) the People's Republic China, (b) Afghanistan, (c) Mongolia, (d) Pakistan, and (e) India.

In order to combat land degradation, several efforts have been made at the national and regional levels to develop monitoring and data collection methodologies and to formulate appropriate policies, programs, and projects. At the national level, such measures include (a) watershed management, (b) soil and water conservation, (c) sand dune stabilization, (d) reclamation of waterlogged and saline land, (e) forest and range management, and (f) the replenishment of soil fertility in arable lands by use of green manures and cultivation of appropriate crops.

In Nepal, the Department of Soil and Water Conservation in critically affected or degraded areas are carrying out various watershed management projects. In India, watershed management programs have also been implemented extensively. Similarly, Pakistan, Bangladesh and Bhutan have also been carrying out integrated watershed management projects, particularly in the high lands, to improve the condition of lightly degraded land and to avoid future degradation.

Parts of the desertified lands in Pakistan have also been rehabilitated with plantations.

Further, the People's Republic of China has achieved remarkable progress in some areas in controlling soil erosion through the implementation of water and soil conservation measures in eight different parts of the country since the State Council initiated a soil erosion control scheme in 1983. Countries such as the Philippines, Thailand, Malaysia, Indonesia, Papua New Guinea, the People's Republic of China, Myanmar, Nepal and Sri Lanka have already enacted laws to minimize the impact of mining activities on land degradation.

Forests

The forests and woodlands of the Asia-Pacific region cover approximately 655 million hectares and represent around 17% of the world's total (FAO/RAPA, 1993). South-East Asia has the highest proportion of forest (33%) while three countries, Australia, Indonesia, and the People's Republic of China, together account for 52% of the forest cover in the region. Most of the countries in the region have at least 20% of their land covered by forest and woodland, with the least forest cover being found in South Asia and the small island developing states. Due to industrialization, agricultural expansion and trade in forest products, deforestation continues to remain one of the major environmental issues in the region.

Deforestation in the region has increased from 2 million hectares per year during 1976-81 to 3.9 million hectares per year in 1981-90. The highest rates of deforestation are found in insular and continental South-East Asia, followed by South Asia and the Pacific. The countries experiencing the most rapid deforestation are: (a) Bangladesh, (b) Pakistan, (c) the Philippines, and (d) Thailand..

Despite these rates of deforestation, 13 countries in the region have per capita forest areas higher than the world average (0.71 hectares per capita). The South-East Asian sub-region has a per capita forest cover of 0.48 hectares per person and also the highest absolute deforestation rates with continental and insular South-East Asia losing around 1.3 and 1.9 million hectares a year,

respectively. In the early 1990s, Indonesia alone had a deforestation rate of 0.6 million hectares per year (around 0.5 % of its forest cover), while Malaysia, Myanmar, the Philippines, and Thailand each lost more than 300,000 hectares a year, representing 2.0, 1.3, 4.0, and 4.0 percent of their forest cover respectively for the period 1981-1990.

In order to cope with the problem of deforestation, national governments have initiated several activities to protect the forest area, such as forest park zoning, wildlife conservation area zoning, national park zoning, plantations, and so forth. However, despite the plantation programs, rapid population growth has contributed not only to destruction of forest by land clearing for cultivation, but also to the over-harvesting of forest for: (a) fuel wood, (b) round wood, and (c) fodder.

Water

Although the region is comparatively well endowed with water resources, it has substantially below the world average per capita availability. Only about one third of the estimated renewable water resources generated by precipitation is available as run-off, another third is lost in deep percolation and the rest simply drains to the sea. Countries such as Afghanistan and the Islamic Republic of Iran suffer from chronic water shortages due to arid climate whereas parts of the People's Republic of China and India experience the same problem primarily due to high population density. Water pollution in countries in the Asia-Pacific region is caused mainly by: (a) domestic sewage, (b) industrial effluents, and (c) run-off from land-based activities, such as agriculture and mining.

Pollution by pathogens is quite severe in South Asia, South-East Asia, the Pacific Islands, and China whereas the problem is relatively minor in developed countries such as Japan, Australia, and New Zealand. In the small island countries, groundwater resources are suffering from severe salinization due to the intrusion of sea water. In Thailand, the rapid lowering of the water table by excessive extraction of groundwater has caused

the shallow aquifers in Bangkok to become contaminated with salt water from the nearby ocean. Over-extraction of groundwater reserves has also caused land subsidence in some cities, such as Bangkok and Jakarta. In countries such as Bangladesh, increased salinity and sedimentation are occurring largely as a result of upstream water withdrawal.

The three sectors consuming the largest amount of water are agriculture, industry and domestic. The high rates of urbanization and industrialization in the region result in increasing demands for water for domestic and industrial uses. With current levels of population growth, demand for water will increase in each sector throughout the region.

Different measures are being taken by many countries in the region to meet the growing demands for water and to safeguard water quality. Such measures include: (a) water reuse and recycling, (b) seawater desalinization, (c) demand-side management, (d) inter-basin transfers, (e) leak detection programs, (f) differential payment rates, (g) legislation (e.g. environmental impact assessment [EIA], water, and effluent standards), (h) protection of wetlands, and (i) use of economic incentives.

Many countries, including Japan, Malaysia, New Zealand, the Republic of Korea and Singapore, employ economic incentives and economic instruments (such as the *polluter pays principle*, *tax rebates*, etc.) to encourage industries to reduce water pollution. Measures to restore water resources include river cleaning programs, as have been undertaken by a number of countries in the region.

Since 1988, Hong Kong has carried out river cleaning activities which have given rise to a steady improvement in river and stream water quality. Similarly, in Surabaya, Indonesia's second largest city, a nationwide clean river campaign program called PROKASIH, has been instrumental in bringing greater public and political pressure onto industrial polluters. As a result, most industries have installed wastewater treatment facilities.

A number of countries in the region have changed the emphasis in their water policies from

supply to demand side management in an effort to improve water conservation. These changes include promotion of water conservation, rationalizing water prices and involving local communities through decentralized water management. Demand side management is being increasingly emphasized in order to decrease the need for heavy investments. Water conservation in Beijing has become popular in both domestic and industrial sectors. Other examples of water conservation can be found in Hong Kong, where freshwater is saved by using seawater.

Air/Atmosphere

In recent years, increasing concern has been expressed about the potential of human activities to alter the earth's climate and its atmosphere. The developing countries of Asia and the Pacific region have been developing more rapidly than all other developing countries in the world for the last three decades; this trend is likely to continue in the future. One of the more important implications of economic growth in the region has been the increased demand for energy. The Asia and the Pacific region (excluding Japan, Australia, and New Zealand) accounted for 21% of the world's primary commercial energy demand in 1992. A growth in energy demand of 3.6% per year for the whole region was maintained between 1990 and 1992, compared with an average growth of 0.1% for the whole world.

A survey by the World Health Organization (WHO) and United Nations Environment Program (UNEP) of the urban air quality in 11 cities in the region revealed that 10 had dangerous levels of suspended particulate matter (SPM) exceeding WHO guidelines by more than a factor of two. In addition to the mega cities, there are a large number of medium and small cities in the region that have serious problems resulting from their development as industrial centers. The greatest pollution-related threat to health comes from the use of low quality solid fuels, such as coal, wood, crop residues and dung for cooking and heating in lower income urban households and in rural areas.

Further, vehicular emissions are a significant problem in all major cities. The government of the Philippines is attempting to address this issue through plans to limit the number of vehicles on the road. Similar measures are also being taken in Thailand. India has implemented programs setting emission standards for vehicles on the road as well as requiring manufacturers to meet strict emission standards for all new vehicles. In several countries, including the Philippines, unleaded petrol has been introduced widely and new vehicles are required to be able to run on this fuel.

Marine and Coastal Environments

The Asia-Pacific marine environment comprises three major sea regions, namely: (a) the South Asian, (b) the East Asian, and (c) the Pacific Islands region.

The South Asian seas region includes: (a) Bangladesh, (b) India, (c) the Maldives, (d) Pakistan, (e) Sri Lanka, as well as (f) the bordering country Myanmar.

The East Asian seas region covers six ASEAN countries: (a) Brunei Darussalam, (b) Indonesia, (c) Malaysia, (d) the Philippines, (e) Singapore, (f) Thailand, (g) Viet Nam, (h) Cambodia, and (i) the People's Republic of China.

The Pacific Island sea region, which is characterized by coral reefs and lagoons, seagrass beds and mangroves, is partially surrounded by Asian, Indian, and Australian land masses.

A large majority of the population in the region resides along the coasts and one quarter of the world's 75 largest cities are situated near, or on, the region's coastlines (ESCAP, 1995). Growth rates of coastal populations are generally higher than the national average as a result of migration to coastal urban areas and industrial centers. Most of these large cities and industrial areas are located in highly productive, low lying estuarine areas.

A major cause for concern throughout the region is over-fishing and the use of destructive fishing techniques, particularly in the highly diverse coral reef systems. Most fish stocks throughout the region are currently being fully harvested, while some are being exploited at unsustainable levels.

Coastal and marine water pollution in this region is mainly due to:

- a) direct discharges from rivers,
- b) surface run-off and drainage from port areas,
- c) domestic and industrial effluent discharges through outfalls, and
- d) various contaminants from ships.

Rivers in this region are generally heavily contaminated with municipal sewage, industrial effluent and sediments. Further, as much as 70% of the waste effluent discharged into the Pacific Ocean has no prior treatment. The major sources of heavy metal contamination are industrial effluents and the dumping of land-based solid waste into the sea.

Coastal construction, particularly for tourist facilities and inland mining, and poor land-use practices have resulted in increased sediment loads in coastal waters in countries such as Fiji, Malaysia, Indonesia, and Thailand. The increased sediment has adverse impacts on sensitive coral reef systems, but in Thailand, there has been a significant improvement in the condition of the reefs because of the efforts of non-governmental organizations (NGOs) and local people.

Tourism, tourism encroachment and recreational activities can themselves be a threat to marine and coastal environments. The construction activities which accompany most tourism developments, such as hotels, beach clubs and marinas, have a range of direct and indirect impacts on coral reefs. Furthermore, pressure from large numbers of visitors can lead to continuing impacts, such as:

- a. physical damage to reefs from trampling,
- b. discharge of untreated or partially treated sewage,
- c. operational leaks and discharges of hydrocarbons, and
- d. waste dumping.

The countries of the Asia-Pacific region have joined various international and regional agreements to resolve the problem. Over the years,

the situation in the coastal zone has improved in a few localities in the region.

Waste

The total amount of solid waste generated each year in the Asia-Pacific region is about 700 million tons and industrial activities generate 1,900 million tons of waste per year (ESCAP, 1995). The total waste generated in the region amounts to 2.6 billion tons a year. The key issues associated with solid waste management, as highlighted in the State of the Environment Report for the Asia Pacific are:

- a) the environmental health implications arising from inadequate coverage of waste collection,
- b) improper storage prior to collection, and
- c) poor standards of disposal.

The disposal of domestic and industrial waste is given relatively low priority in many countries. Solid waste disposal is a particular problem in the small island states because of their limited land area. In some of these countries, solid waste has been used for land reclamation, resulting in contamination and pollution of surrounding coastal areas.

Disposal of wastewater poses another problem. In many places, untreated domestic and industrial wastewaters are discharged directly into canals and rivers. Some governments are in the process of taking measures to treat wastewater, for example the Government of Thailand has agreed in principle to establish a Central Waste Water Management Authority to consolidate policies and institutions to deal with this matter. In Singapore, 36 industries were prosecuted in 1993 for discharging acidic effluents into the sewers (ASEAN, 1995). In addition, facilities for handling wastes and ensuring stringent enforcement of standards have improved significantly.

The quantity of solid wastes being generated is increasing rapidly with growing economic activity and the production and use of consumer items. In addition, large quantities of industrial and hazardous waste, brought about by an expansion in chemical-

based industry in the region, has exacerbated the waste management problem. Inadequate waste disposal and management facilities present serious environmental health implications and will continue to do so if corrective actions are not taken immediately. Such actions include not only the establishment of regulatory mechanisms, but also effective enforcement of these regulations.

FACTORS INFLUENCING THE “QUALITY OF ENVIRONMENT”

The driving forces for different environmental issues vary across the Asia-Pacific region, but are fundamentally related to population levels. The driving forces are a result of the dynamic interplay of socio-economic, institutional and political, and technological activities. Although high economic growth is being achieved in many countries in the region, poverty is still a problem at the root of several environmental problems. Impact on the environment caused by the developed and the newly industrialized countries in the region, as well as the unsustainable use of natural resources by those countries (and other developed countries outside the region) have also been considerable. Following factors have been found to be responsible for the environmental situation the Asia-Pacific region is placed in:

Social and Demographic Factors

Population Growth

Asia and the Pacific is the most populous region of the world with 58% of the total global population concentrated in about a quarter of the global land surface. Population size, growth rate and distribution have contributed significantly in shaping the environment in this region. The impact of population on the environment is primarily through the use of natural resources and production of wastes. The countries likely to face environmental stress, because of demographic trends (both population growth rate and densities) in the coming decades, are the Maldives, Pakistan and

Bangladesh, closely followed by Nepal, Viet Nam, India, and the Philippines.

Other major environmental impacts associated with a rapidly growing population are related to the increased pressure on arable land, such as expansion of human settlements, clearing land for cultivation, intensive agriculture for intensified food production and overgrazing. Similarly, there is a strong correlation between the population growth rates and deforestation rates.

Migration

Migration from rural to urban areas has contributed about 40% of urban population growth during the period 1970-90 in most developing countries of the region (ESCAP, 1995). The major environmental problem arising from the process of urban development in the region is increasing pollution levels. Deforestation is another problem associated with urban expansion. Coastal areas with sensitive ecosystems have also suffered from the continuing pressure of urbanization in the region. In the Pacific sub-region, urban areas are running short of fuel wood as coastal mangroves and inland forests are depleted. In Tuvalu, pressure on the coastal environment has also resulted from the migration of people from the outer islands to the dense shanty areas in the capital city on the Fogafale Islet.

Economic Factors

Industry

The environmental impact of industry has become increasingly evident from:

- a) natural resource depletion,
- b) contamination of water, air and land, health hazards, and
- c) degradation of natural ecosystems.

Industrial sources contribute a relatively high share to air pollution in this region because the main source of industrial energy is fossil fuels with a high proportion of coal, and the major air polluting industries such as iron, steel, fertilizer, and cement

are growing. Water polluting industries in the region are also expanding very rapidly. For instance, in China in 1992, approximately 64% of the total wastewater generated was from the industry sector. Both the quality and quantity of industrial solid waste present problems for the environment.

Transport

The transportation sector has become a key accelerating factor for economic growth as well as for environmental degradation. Transport activities have a wide variety of effects on the environment, such as:

- a) air pollution and noise from road traffic,
- b) oil spills from marine shipping, and
- c) the depletion of natural resources.

In a few cities in the Asia-Pacific region the heavy concentration of road networks and vehicles has resulted in high levels of pollution. Road transport, for example, accounts for a major share of the air pollution load in cities such as Delhi (57%), Beijing (75%), Manila (70%), and Kuala Lumpur (86 %).

Port and harbor projects mainly influence sensitive coastal ecosystems. Their construction affects hydrology, surface water quality in the coastal zones, fisheries, coral reefs and mangroves to varying degrees. Countries like the People's Republic of China, Hong Kong, India, Japan, Malaysia, Philippines, Singapore, Thailand, and Papua New Guinea are making substantial investments in the expansion of maritime transport. These countries are also carrying out dredging operations to maintain transportation facilities at ports.

Agriculture

Agriculture in the Asia-Pacific region has witnessed accelerated structural changes over the past 40 years. Direct impacts on the environment arise from farming activities, which contribute to soil erosion, land salinization and loss of nutrients. It has been estimated, for example, that about 25% of the soil degradation in the Asia-Pacific region

has occurred directly from agricultural activities. Shifting cultivation has been an important cause of land degradation in many countries of the region including Bangladesh, Brunei Darussalam, Fiji, India, Indonesia, the Lao PDR, Malaysia, Myanmar, Nepal, Papua New Guinea, Philippines, Solomon Islands, Sri Lanka, Thailand, and Viet Nam. In addition, natural habitats are being destroyed, degraded and depleted, with the loss of countless wild species. The largest demand for water within the region presently comes from agriculture; more than two-thirds of the water abstracted from rivers, lakes, and aquifers in the region is used for irrigation. There is also considerable evidence that the leaching of fertilizer into water bodies is a significant source of water pollution.

Tourism

Over past two decades, there has been impressive growth in tourism within the region. This growth has generally led to:

- a) the creation of additional employment,
- b) an increased flow of foreign exchange,
- c) increased infrastructural development, and
- d) the restoration of cultural, religious and heritage sites.

Out of the 500 million world-wide international tourist arrivals in 1993, 14.5% (72.4 million) were registered in the Asia-Pacific region, compared with only 1.3% in 1960. However, the growth in tourism has also resulted in significant negative environmental impacts, particularly in relation to important ecosystems, namely mangroves, forests and coral reefs, etc.

Impacts on the physical environment are largely related to tourism infrastructure development (including resorts, hotels, and coastal zone management activities) inducing soil erosion, landslides, sedimentation, water pollution, and so forth. Unplanned development of infrastructure too close to the shoreline has affected natural coastal processes leading to beach erosion in some places, particularly Fiji, Indonesia, Maldives, Malaysia,

and Sri Lanka. Further, mangrove forests in Thailand, Fiji, and the Philippines are also currently under threat from tourism-related development and associated activities, including direct encroachment from hotel and resort construction, exploitation for fuel wood and clearance for shrimp farming.

Trade

Promoting liberal trade while maintaining and strengthening protection of the environment and natural resources is one of the great policy challenges of the decade. There has been a widespread inflow of polluting industries and hazardous waste from developed nations, and also an outflow of raw materials and resource intensive industrial products to developed countries. The direct effects of agricultural trade liberalization on Asian environmental resources are not yet clear. However, increasing product prices are likely to lead to a greater demand for agro-chemicals. The demand for water could also rise, which is an important consideration in countries with seasonal water scarcity, such as Thailand. Studies of the impact of trade on land resources have shown a positive correlation between the rate of forest conversion and crop prices. Similarly, the principal, direct environmental impact of manufactured goods and their export, is industrial pollution. While almost 75% of total world exports from polluting industries originate from industrial countries, the South-East Asian share of total world exports of polluting industry products increased from 3.4% in 1965 to 8.4% in 1988. This increase reflects the region's rapid expansion in manufactured goods exports. South Asia's share (based on India, Pakistan, and Sri Lanka) rose from 2.1% to 2.8% over the same period.

Institutional Factors

In the Asia-Pacific region, government responsibility for the environment rests with environment ministries, with a division or a unit in another ministry, with independent environment agencies or with departments created to assist the environment ministries. Most of the environmental

institutions in the developing countries of the region are relatively small and suffer from unsatisfactory staffing and financial resources. Command and control is the main environmental policy instrument in the region. Strategic environmental planning, legislation and regulatory standards and planning procedures are the most commonly used tools for environmental control. The least used instruments are those related to economic incentives. Environmental institutions often have no power to audit the environmental performance of sectoral institutions. Thus, they are attempting to strengthen performance by developing additional tools or by improving existing ones. Two major shortcomings with regard to the greening of industry and business in the region are:

- a) the weak monitoring and enforcement capabilities of environmental institutions, and
- b) the lack of green consumerism.

There are also many problems associated with the use of risk assessment by developing countries, including the lack of trained personnel and comprehensive databases (whether industrial, medical, or environmental). There is a modest level of participation by the developing countries of the region in international agreements, whereas for the least developed countries it is low. In most cases, the reason for non-implementation is inadequate availability of the professional and administrative expertise and resources that would be required for the formulation and implementation of relevant domestic legislation.

POLICY RESPONSES

A recent trend in many countries in the Asia-Pacific region has been the strengthening of governance structures for environmental protection. A large number of environmental institutions have been established in the public sector, including environmental ministries. Independent environment agencies or departments

have also been created to assist the environment ministries. Institutional strengthening of these recently established environment agencies is required to help them to fulfill their mandated roles. The main environmental policy instruments applied in the region are command and control policies and strategic environmental planning. Legislation, regulatory standards and environmental planning procedures related to public works, particularly Environmental Impact Assessments (EIA), are the most commonly used instruments of environmental management. Good examples are found in China and Malaysia. The Malaysian Environmental Quality Act and several other sectoral Acts, for example, regulate most forms of pollution and enhance environmental quality and management. Recently, there has been a conscious effort to develop new environmentally friendly technologies and to incorporate environmental considerations in production processes. An example is the National Environmental Engineering Research Institute (NEERI) in India and the Ebra Corporation in Japan, which specializes in developing technology to combat air pollution.

Further, since the Earth Summit in 1992, great emphasis has been placed on regional environmental cooperation. Examples of this include such inter-governmental bodies:

- the Association of South East Asian Nations (ASEAN),
- the International Centre for Integrated Mountain Development (ICIMOD),
- the Mekong River Commission, and
- the South Asia Cooperative Environment Programme (SACEP).

The South Pacific Regional Environment Programme (SPREP) and the Economic and Social Council for Asia and the Pacific (ESCAP), with assistance from members of the Interagency Committee on Environment and Sustainable Development, prepare regular regional State of the Environment (SoE) reports every five years. The July 1993 Meeting of the ASEAN Senior Officials on the Environment (ASOEN) (representing Brunei

Darussalam, Indonesia, Malaysia, the Philippines, Singapore, and Thailand) agreed to develop a new “ASEAN Strategic Plan of Action on the Environment (1994-1998)” with various objectives. Environmental cooperation within ASEAN is thorough and may provide a model for other regional organizations.

Furthermore, SACEP (covering Afghanistan, Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan, Sri Lanka, and the Islamic Republic of Iran) continues the implementation of an Action Plan. This Action Plan, known as “SACEP’s Strategy and Programme (1992-1996)” covers key areas of activity, namely:

- capacity building and awareness raising;
- systematic information exchange and intra-regional technology transfer;
- training on environmental management and institutional development;
- regional cooperation in management of mountain ecosystems, watersheds and coastal resources; and
- wildlife and wildlife habitat conservation in the region.

SPREP was established in 1993, covering 22 Pacific Island countries and territories, with the aim of enhancing institutional capacity to serve its members. It has also initiated an “Action Plan (1991-95)”, which is a regional strategy covering many aspects of environmental assessment, management and law within the sub-region.

Furthermore, the Mekong River Commission (representing Cambodia, People’s Republic of China, Lao PDR, Myanmar, Viet Nam, and Thailand) is an inter-governmental organization responsible for cooperation and coordination in the use and development of the water resources. In the year 1991, an Environment Unit was established within the Technical Support Division to deal with the environmental issues in this sub-region.

ICIMOD (representing Afghanistan, Bangladesh, Bhutan, China, India, Myanmar, Nepal and Pakistan), which was established in Nepal in 1983, continues the implementation of its

different programs to attain environmental stability, sustainability of mountain ecosystems and poverty eradication in the Hindu Kush-Himalayas

ENVIRONMENTAL INFORMATION

Information for environmentally sustainable development planning and management is a major concern in developing countries in the Asia-Pacific region. Assistance is provided by donor agencies to developing countries to improve the availability of reliable environment-related data for environmental assessment and sustainable decision-making. UNEP/EAP-AP is helping to formulate an assessment framework and to lay the foundation for the use of a standard SoE database in the region. This database will support SoE reporting as a basis for policy formulation, priority setting and action planning. With associated countries in South Asia, Greater Mekong Sub-regions (GMS), South East Asia and the South Pacific, UNEP/EAP-AP has formulated a program to service environment and natural resource information networking among database custodians in order to facilitate cooperative international assessments related to shared resources.

ENVIRONMENTAL ECONOMICS

The Asian Development Bank (ADB) and the government of Norway, together with Harvard University, have developed a set of environmental indices for monitoring environmental changes. The study involved a systematic evaluation of the cost of impacts on the environment by calculating how much it would cost to restore an environmental situation. It put forward the development of a Cost-of-Remediation (COR) index for ADB’s developing member countries in the Asia-Pacific region. The second major index developed by this study, the Environmental Elasticity (EE), responds to the need to maintain awareness of changes in the environment as an economy develops. It aims at measuring the change in environmental quality

relative to change in economy over time (Asia Development Bank, 1996).

CONCLUSION

Policy analysts and researchers have opined that deforestation, inadequate water supply and water quality need priority attention in the Asia-Pacific region. Air pollution is an increasingly serious problem for the large mega cities of the region, such as Mumbai, Bangkok, Jakarta, and Manila. By contrast, the small island states of the Pacific, such as Fiji, Maldives, and Western Samoa, suffer from irregular and inadequate solid waste disposal facilities. Furthermore, environmental degradation places additional burdens on women, especially those living in and depending on fragile ecosystems. In rural part of the developing world, it is women who are responsible for collecting drinking water as well as wood for fuel.

There is, thus, need to give a new impetus to international action on the protection and conservation of the environment, while at the same time promoting and caring for the development aspirations of nations in the Asia-Pacific region. The national governments are urged to:

- give the necessary policy and scientific support to be continued in the future,
- provide an effective means to link sectoral and regional assessments, and
- provide an overarching framework for ongoing international assessment activities.

In response to the environmental issues recognized in the Asia-Pacific region, numerous initiatives have been launched at national, sub-regional and regional levels. It is clear that while problems do exist and are significant, there is a concerted effort at the national, regional and global levels to address these problems and to bring about effective and viable solutions as soon as possible.

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